NOTES ON AUSTRALIAN ANTS, WITH DESCRIPTIONS OF NEW SPECIES AND A NEW GENUS.

By John Clark, Entomologist, National Museum.

(Plate I.)

In a recent paper dealing with colony-founding by Ants of the genus *Myrmecia* (Science, vol. 76, pp. 532–533, 1932) Dr. W. M. Wheeler gives a description of the queen and her incipient colony; and he deals with the same subject in greater detail in a later publication, in book-form, entitled "Colony-Founding Among Ants," Harvard University Press, 1933. In this fine work the author gives fully the results of his observations in Australia during 1931. In addition to describing colony-founding by the primitive Australian Ponerinae, he has described a number of new forms and supplied notes on many obscure species.

On pages 21–22 he quotes in full an abbreviated account of colony-founding published by me (Victorian Naturalist, xlii, pp. 135–144, 1925). Commenting on my account of these he says (p. 22) :—

> "It would seem, therefore, that the *Myrmecia* queen, apart from feeding her larvae on insect food, founds her colony in precisely the same manner as the young queens of the higher ants. This is not the case, however, since a significant idiosyncrasy of her behaviour has been overlooked, as will appear in my account of *Myrmecia regularis* and several other species."

Regarding *Myrmecia regularis*, he says (p. 26), after dealing with this ant and its habits :—

> "Diligent search enabled me to find more than twenty nest-founding females of *regularis*. Since these must have been fecundated sometime between February and April, 1931, and since in the genus Myrmecia as in other Ponerinae the females and workers differ so little in size, and especially in the relative volumes of the thorax and gaster, as contrasted with the queens and workers of the higher ants, it seemed to me improbable that the *regularis* queen could fast and survive on her small amount of fat and wing-musculature for a period as long as seven or eight months. That we are not compelled to make such a supposition was demonstrated by the following observations.
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> "I found that each of the females occupied a large flat cell (Fig. 6) varying from $2\frac{1}{2}$ to 4 inches in diameter under a large stone or log rather deeply embedded in the soil. The lower surface of the stone or log formed the roof of the cell; its earthen floor was quite flat and

its walls continuous on all sides. It was always situated nearer the periphery of the stone or log than the centre, so that the outer wall of the cell was quite thin. In most cases a large gallery descended into the soil from the floor of the chamber perpendicularly or obliquely for a distance of about six inches and terminated in a second smaller and more irregular chamber. When the stone or log was turned over the queen fled precipitately into this second chamber, which is therefore used as a retreat in case of danger. It was sometimes difficult to capture the escaped queen because the gallery was often excavated between immovable stones or roots. Usually there was only one female under a stone, but on one occasion I found three, each in a separate cell and separated by nearly a foot of earth from the others. Some of the females were quite alone, but others had a number of eggs scattered on the floor of the upper cell or a small cluster of young or nearly half-grown larvae. The latter were sometimes found feeding on fresh pieces of insects, such as caterpillars and the gasters of deälated ant females of the genera Camponotus and Orthocrema. This food, of course, must be obtained outside the nest, and since the superficial cell is closed off on all sides, we must assume that the *regularis* female does not remain rigidly confined like the females of the higher ants during her whole colony-founding period, but leaves her nest from time to time to secure insect food for her brood and also in all probability, nectar and sap for herself. This is indicated also by the following observations and inferences. First, I have taken a few *regularis* females wandering about in the open. They could not have been recently fecundated individuals because the *regularis* nests contain no young sexual forms during October and November and it was far too early for any nuptial flight of the species. Second, I found two incipient nests, each containing a cluster of sound and active larvae but no females. I could only suppose that they happened to be out foraging at the time when I uncovered their cells. Third, the outermost earthen wall of the cell in several instances looked as if it had been broken open and restored repeatedly. In the case of *Myrmecia analis* mentioned on p. 44 I actually found an opening in this wall! And fourth, the cells inhabited by the females and larvae were always exquisitely clean, indicating that the former must carry all refuse insect food to the outside, as Clark has described (see p. 22) for the adult colonies. I believe, therefore, that the *regularis* female makes her cells soon after her nuptial flight and then leads the life of a recluse till October or November, occasionally breaking through the outer wall and foraging for food. With the return of spring in October the more abundant food-supply enables her to lay a number of eggs and to rear a few larvae with insect food which she captures on similar excursions. Additional evidence of this behaviour is given in connection with several of the following species of Myrmecia."

In the above account some peculiar statements are not quite explained. First, the latter half of the first paragraph on p. 26 would make it appear that I had stated that the queen fasts for a period of seven or eight months while maintaining herself on her body fat. I stated definitely that the larvae are fed on insects, supplied by the queen alone, and that it was six to seven months before the first workers left the cocoons. In this statement Wheeler absolutely supports my observations by the following statement on page 39 :—

> "November 2nd, 1931, I found a very interesting incipient colony of *nigriceps* under a large log at Margaret river, Western Australia. It consisted of the mother, eight small workers, three worker cocoons and several larvae of various sizes."

It is difficult to reconcile this fact when he states on page 29 that the female leads the life of a recluse, until October or November.

The female does not lead the life of a recluse, for all during the winter months she may be found foraging for food both for herself and larvae. I have reared a large number of species in artificial nests and the results correspond with those obtained in the bush. Early in March of last year (1933) a large marriage flight of *Myrmecia forficata* Fab. took place at Ferntree Gully. Three weeks later it was desired to secure some working colonies for demonstration at a natural history exhibition in Melbourne on the 5th to 7th April. Knowing that queens could be obtained there, a representative of the exhibition committee and my daughter Mabel accompanied me to Ferntree Gully to secure material. Within an hour we found several females with their cells complete and some of them with their eggs. One of the females exhibited had fourteen eggs, three of which hatched before the exhibition closed. This female is still alive and well with her larvae; with ordinary care these larvae will have pupated and the ants issued in October or November as found by Dr. Wheeler, and stated by me in 1925.

On pages 49–55 Wheeler deals at length with *Myrmecia (Promyrmecia) aberrans* Forel and its various forms. He says (p. 53–54) :—

> "The nests of three of the above described subspecies, *formosa, haematosticta* and *maura* are practically identical. Those of the first and second subspecies were found November 26 and 27 near Uralla in open sheep pastures on volcanic soil at an altitude of about 3000 ft. only by patiently following the rare, single workers which were returning home with insect prey. No mound marks the site of the nest, which is a mere hole (Fig. 20) a quarter of an inch in diameter, leading into a perpendicular gallery terminating at a depth of somewhat more than a foot in a small chamber. Usually only three or four workers and no female were found with a small number of cocoons in this chamber. Even including foraging workers a colony can scarcely comprise more than a dozen individuals. They were by no means aggressive. While foraging they crawled about rather slowly and were never seen to climb the vegetation nor to jump like other small species of Myrmecia."

Further on he says (p. 54) :—

> "These meager notes indicate, perhaps, that the subgenus Promyrmecia should be retained as defined by Emery, since *aberrans* differs not only morphologically but also ethologically from all the other smaller Myrmecias which Clark has included in the group.

> "The absence of any winged or deälated females of the usual type either amongst the specimens of *aberrans* and its subspecies hitherto collected or in any of the nests which I excavated, raises the question as to the existence of such forms. etc., etc."

A nest of *M. (P.) aberrans* found by me at Altona, Victoria, contained over 50 workers and two females, whilst a nest, in the same locality, taken by Mr. T. Greaves, a young Myrmecologist, had over that number of workers, eight females and seven or eight winged males. The female is ergatoid, as is also the female of an undescribed species in my collection. No winged females have been found, and in that respect this species resembles *Myrmecia esuriens* Fab. of Tasmania. The ethology of *M. (P.) aberrans* does not differ from several of the other small species. The nest and habits of *M. (P.) picta* Smith are similar; these are dealt with below. As to the morphology, when one is familiar with the sexes and forms of all known small species it is at once apparent that if Emery's subgenera are to be maintained it becomes necessary to erect a new subgenus for every second species; the difference so apparent in the workers are, however, not apparent in the males and females, and the subgenera are therefore not justified. With the material already available a complete range of forms exists connecting *M. aberrans* at one end of the group with *M. mandibularis* at the other. While the connection is evident in the workers it is even more so in the females. They must be the deciding factor. At present we know these ants from limited areas only and undoubtedly future collecting will reveal many forms at present not suspected.

In the following pages *Myrmecia (Promyrmecia) aberrans* Forel has been redescribed and the previously unknown male and female described and figured. The much confused species *M. (P.) picta* Smith has also been redescribed in detail and an attempt has been made to clear up the synonymy. A new species, *Myrmecia (Promyrmecia) fucosa* n. sp., has been included to show relationship with *M. (P.) picta* with which it is almost identical in colour, sculpture and pilosity, but with very different mandibles. *Myrmecia esuriens* Fab. has been redescribed and the previously unknown female compared with it. This female is ergatoid (worker-like) and easily overlooked. A new genus *Nothomyrmecia* has been erected to contain a remarkable species from Western Australia. The position of this genus is doubtful. The tribe *Myrmecii*, to which it appears to belong naturally, is characterised as having narrow mandibles and a two-jointed pedicel. These characters cannot be applied to *Nothomyrmecia*; it may, therefore, be necessary to erect a new tribe, *Nothomyrmecii*, to contain this genus.

The types of the new forms are in the National Museum, Melbourne.

Family **FORMICIDAE** Latreille 1810.

Subfamily **Ponerinae** Lepeletier 1836.

Genus MYRMECIA Fabricius 1804.

Subgenus PROMYRMECIA Emery 1911.

Myrmecia (Promyrmecia) aberrans Forel.

(Pl. I, figs. 1, 2.)

Myrmecia aberrans Forel; Ann. Soc. Ent. Belg. xliv, p. 54, 1900, ♀; Rev. Suisse. Zool. xviii, p. 9, 1910, ♀.

Myrmecia (Promyrmecia) aberrans Forel; Emery, Gen. Ins., Fasc. 118, p. 19, 1, fig. 10, 1911, ♀; Clark, Victorian Naturalist, xlii (6), p. 136 and 140, 1925, ♀; Wheeler, Colony Founding Among Ants, Harvard University Press, 1933, ♀.

Worker.—Length, 10–14 mm.

Black; top of the pronotum, mesonotum, epinotum and node, red; mandibles and labrum yellowish red, points of teeth black; antennae and tarsi brownish. Some examples have a reddish tinge on lateral borders of the head behind.

Shining. Head longitudinally striate in middle, the striae between frontal carinae continued from front of clypeus to occipital border; sides of clypeus and antennal depressions not striate, but finely and densely punctate, these fine punctures continued between the striae on head; some large scattered punctures on occipital border. Pronotum longitudinally striate in middle, longitudinally arched at sides above: mesonotum smooth and shining, with some scattered shallow punctures; there are faint traces of fine longitudinal striae on some examples. Epinotum coarsely striate transversely, descending obliquely on the sides; node circularly striate, with a central longitudinal carina; postpetiole, gaster, scapes, and legs very finely and densely punctate.

Hair yellowish, sparse on head and body, more abundant on the apical segments of gaster, but short and erect; shorter and adpressed on the tibia and tarsi, tibia also furnished with some long bristle-like hairs on the underside. Pubescence greyish, very fine and adpressed on clypeus and funiculus; more abundant on postpetiole and gaster, shorter and finer on sides of thorax.

Head very slightly broader than long, broader behind than in front, occipital broader concave, angles broadly rounded. Mandibles short and broad, not as long as head, external border feebly concave at middle; inner border nearly straight to basal third, thence strongly reduced to base; furnished with twelve teeth, first two small, third, fifth, seventh, eighth, tenth and eleventh strong and obtuse; the tenth forms the angle between the two apparent borders. Frontal carinae short, extending to about the posterior third of eyes. Clypeus strongly excised at middle in front, the excision obtuse, sides straight, forming a sharp tooth-like projection on each side. Labrum sharply rounded, projecting outward almost to the points of clypeus. Eyes large, moderately convex; ocelli small. Scapes not extending to occipital

border by one-fifth of their length ; first and second segments of funiculus equal, third somewhat shorter, apical as long as the two preceding together. Thorax twice as long as broad. Pronotum one and one-half times broader than long, broader in front than behind, slightly depressed above. Mesonotum almost circular, very slightly broader than long, convex and rounded above. Epinotum one and one-fifth times longer than broad ; in profile the dorsum and declivity appear as an even arch. Node circular, as broad as long and as broad in front as behind ; the stalk in front very short, barely one-third of the length of node ; in profile a little higher than long, rounded above, anterior and posterior faces vertical ; postpetiole one and one-half times broader than long, broadest at middle. First segment of gaster broader than long, and broader behind than in front. Legs moderately long.

Female.—Length, 16–18 mm. (Ergatoid.)

Colour identical with worker. Sculpture slightly coarser. Pilosity similar.

Apart from the greater size and bulk it closely resembles the worker. The scutellum is very small and inconspicuous. The metanotum is indicated by a sharp ridge. There are no traces of wings, but the anterior wing sclerites are indicated.

Male.—Length, 13–14 mm.

Black. Antennal scapes and first segment of funiculus, femora of all legs, and anterior tibiae and apical segments of tarsi, red ; middle and posterior tibiae brownish.

Mandibles shining, finely punctate. Head finely reticulate, coarser behind, with some large shallow punctures. Pronotum similar. Mesonotum similar in front. Epinotum with coarse reticulations forming faint transverse rugae. Node irregularly rugulose, with a strong longitudinal central carina. Postpetiole and gaster finely and densely punctate.

Hair yellow, erect, long and abundant except on antennae and legs. Pubescence white, very fine, short and adpressed, particularly abundant on gaster.

Head broader than long, broader in front than behind, sides strongly convex, occipital border short and straight. Mandibles short, not raised. Scapes fully twice as long as first segment of funiculus ; second segment four times as long as first. Eyes large, feebly convex, placed in front. Ocelli large. Pronotum short, strongly convex. Mesonotum convex in front, flattened behind, mayrian furrows distinct but not strongly impressed ; parapsidal furrows sharply defined. Scutellum strongly convex above, twice as broad as long. Epinotum twice as broad as long, strongly convex in all directions. Node slightly broader than long, sides strongly convex. First segment of gaster much broader behind than in front. Legs slender. Genitalia retracted.

Habitat.—Victoria, Altona (J. E. Dixon, ☿) ; T. Greaves, ☿ ♀ ♂ ; J. Clark, ☿ ♀) ; Bacchus Marsh and Coburg (C. Oke, ☿ ♀) ; Broadmeadows (F. P. Spry, ☿).

All the females examined are similar to the worker and apart from their greater size are difficult to detect. Ergatoid females occur with several species of the genus, but winged forms also are known with the majority.

Myrmecia (*Promyrmecia*) *picta* Smith.

(Pl. 1, figs. 3, 4.)

Myrmecia picta Smith, Cat. Hym. Brit. Mus. vi, p. 146, 1858, ☿ ♀ ; Lowne, The Entomologist, Lond. ii, p. 336, 1865, ☿.

Myrmecia (*Promyrmecia*) *picta* Smith ; Clark, Victorian Naturalist, xliv (2), p. 39, 1927, ☿ ♀ ♂.

Worker.—Length, 9–12 mm.

Black. Mandibles, clypeus, front of face, to about the hind margin of eyes, yellow ; antennae and anterior legs reddish-yellow ; intermediate and posterior legs brownish ; tarsi lighter. The colour of the thorax and nodes is most variable, ranging from all black on some specimens, to all red on others. The most numerous individuals have the head, behind the eyes, pronotum and a spot on mesonotum, black ; edges of mesonotum, all the epinotum, node and greater portion of postpetiole red, or reddish-yellow. The gaster always black.

Head longitudinally striate, finely and densely reticulate between the striae. Mandibles shining, with scattered elongate punctures. Pronotum transversely arched, striate-rugose, in some specimens almost longitudinally arched. Mesonotum finely transverse rugose, in a few examples almost smooth. Epinotum transversely, often irregularly, rugose, definitely striate on declivity. Node irregularly rugose. Postpetiole and gaster very finely and densely punctate.

Hair yellowish, erect, rather long and abundant throughout, none on scapes, longer and more abundant on apical segments of gaster than elsewhere. Pubescence greyish, very fine and abundant, particularly on postpetiole and gaster, frequently appearing as a greyish covering.

Head as long as broad, broader in front than behind, occipital border nearly straight, angles rounded. Mandibles not as long as head, external border concave at middle. Inner border nearly straight to basal fifth, thence sharply reduced to base ; furnished with nine teeth, first two small, third, fifth, seventh and nine twice as large ; the ninth forms the angle between the two apparent borders. In some examples there is indication of a tooth on basal border but this is usually edentate. Frontal carinae short, almost parallel. Clypeus strongly excised at middle in front, inner edges straight. Labrum projecting almost to points of clypeus, anterior border feebly rounded. Eyes and ocelli large and convex. Scapes not extending to occipital border ; second segment of funiculus one-third longer than first and third, fourth to eighth equal, ninth and tenth shorter, apical as long as the two preceding together. Thorax fully two and one-half times as long as broad. Pronotum almost twice as broad as long, dorsal surface slightly rounded. Mesonotum circular, rounded above. Epinotum longer than broad, without a boundary between dorsum and declivity ; the latter short. Node broader than long, slightly broader behind than in front ; in profile much higher than long, rounded above, the stalk in front short, not half the length of node, anterior face nearly vertical, posterior face sloping behind. Postpetiole one and three-fourths times broader than long, much broader behind than in front, convex on sides and above. First segment of gaster broader than long. Legs long and moderately slender.

Female.—Length, 13.5–14.5 mm.

Differs from the worker only by larger size and in possessing wings. The colour appears to be more constant. In all the examples examined the occiput, pronotum, margins of the other segments and gaster are blackish; the mesonotum, scutellum, epinotum, node and postpetiole red. All the legs are uniformly castaneous, except the apical half of posterior femora, which are brown. Front of face bright yellow. Four corners of node more clearly defined, but not sharp. Wings hyaline. Ergatoid females also are present.

Male.—Length, 10-11 mm.

Black; mandibles, five basal segments of antennae, front of face and all the legs, yellow; eight apical segments of antennae, brown.

Head finely striate-rugose on middle, becoming coarser at lateral and occipital borders. Mandibles shining, coarsely and sparsely punctate. Pronotum, scutellum, mesonotum and epinotum coarsely reticulate-punctate. Node coarsely and irregularly rugose. Postpetiole and gaster very finely and densely punctate.

Hair greyish, long and suberect, longer and more abundant on head and thorax than on gaster, short and adpressed on legs, none on antennae. Pubescence greyish, short, most abundant on gaster.

Head broader than long, broader in front than behind; occipital border convex. Mandibles short, triangular, external border convex; diverging behind. Clypeus long, convex and rounded above, concave at middle in front. Antennae long and slender; scapes short; first segment of funiculus half as long as scapes, second three and one-half times as long as scape, third slightly shorter than second, the others about equal. Thorax barely twice as long as broad. Pronotum strongly rounded in front and above. Mesonotum large, convex and rounded above, mayrian furrows distinct; a deep longitudinal suture extends from anterior border to near base; parapsidal furrows faintly defined. Scutellum broad, strongly convex. Epinotum strongly convex and rounded above, without a boundary between the dorsum and declivity. Node slightly broader than long, almost circular, strongly convex above. Postpetiole broader than long, broadest just behind the middle, strongly convex above and on sides. First segment of gaster broader than long. Pygidium convex and rounded. Cerci long and pointed. Genital armature; annular lamina short, about one-third of the length of squamulae, latter slightly longer than broad, broader behind than in front, sides evenly convex; in profile strongly convex and rounded above. Stipites long and bluntly pointed, curved inward and slightly upward at the point. Volsella long, laminate, pointed at tip. Lacinia short, laminate. Sagittae long thickened towards apex. Straight above to near apex then curved upward; apical face vertical, rounded above and below, with a row of small, sharp teeth at lower third, directed downward. Subgenital lamina one and one-fourth times longer than broad at base, strongly reduced from basal third to apex; this feebly concave, nearly straight, without a projection at middle in front. Stipites, apex of squamulae and of subgenital lamina, punctate. Hair yellowish, erect, long and pointed on stipites and subgenital lamina, shorter and suberect on squamulae. Legs long and stout.

Habitat.—Western Australia: Merriden (L. J. Newman), National Park and Mundaring (J. Clark), Yellowdine (W. Joyce). South Australia: Mt. Lofty (A. H. Elston). Victoria: Maldon (J. C. Goudie), Mallee (J. E. Dixon), Wyperfield (J. Clark). New South Wales: Broken Hill (F. W. Shepherd), Narrabri (W. W. Froggatt).

The colour varies considerably in the individuals of a single colony. Many specimens are entirely black, with the exception of mandibles, front of face, antennae and anterior legs. Others have thorax, petiole and anterior half of postpetiole entirely red or variously marked with red. The extent of yellow area on front of face also varies slightly. In some examples this does not pass anterior margin of eyes, whilst in others it extends well beyond posterior margin. Although the colour varies considerably, the sculpture, pilosity and pubescence are constant. The same colour varieties occur in all colonies obtained from each state.

This species is one of the most confused in the genus. Judging from the works of other Myrmecologists it had not been seen since Lowne recorded it from Sydney. There is little doubt as to the form taken by Lowne, as he appears to have written his paper with the assistance of Smith. He records *M. picta* immediately preceding the description of *M. urens*, a species which has apparently been mistaken for *M. picta* by Mayr, Forel and Emery. In order to be certain of this, and of Smith's other species of the genus, specimens were forwarded to my friend Mr. W. C. Crawley, who compared them with the types in the British Museum. In addition to sending notes, Mr. Crawley made drawings of the various types. A comparison with these shows clearly that the species regarded by both Mayr and Forel as *M. picta* is really that described by Lowne as *M. urens*. Forel records *picta* from Fremantle and added two varieties from that locality. The species found at Fremantle is not *picta*, and the two varieties described do not belong to this species.

The confusion undoubtedly arises from Smith's rather poor descriptions in 1858, but he certainly states clearly that the front of the face is yellow, none of the others has a yellow face. In 1865 Lowne recorded *picta* from Sydney and on the same page described *urens* which superficially resembles *picta*, but actually is not connected with it. In 1866 Mayr described *pumilio* from Queensland, and later (1876) lumped all together as one variable species. From his remarks it is evident that he never saw *picta* and had confused *urens* with *pumilio*. Specimens of *pumilio* in the National Museum collections, received from the Godeffroy Museum in 1888, are the true *pumilio*, from Rockhampton, Queensland. The synonymy of this confused group is as follows :—

MYRMECIA (PROMYRMECIA) PICTA Smith :

Myrmecia picta Smith, Cat. Hym. Brit. Mus. vi, p. 146, 1858, ♀ ♀ ; Lowne, The Entomologist, Lond. ii, p. 336, 1865, ♀ ; Mayr, Jour. Mus. Godeffroy, xii, p. 94, 1876, ♀ ; Emery, Gen. Ins., Fasc. 118, p. 20, 1911, ♀ ♀.

Myrmecia (*Promyrmecia*) *picta* Sm., Clark, Victorian Naturalist, xliv (2), p. 39, 1927, ☿ ♀ ♂.

MYRMECIA (PROMYRMECIA) URENS Lowne :

Myrmecia urens Lowne, The Entomologist, London, ii, p. 33, 1865, ☿.
Myrmecia picta Mayr, Jour. Mus. Godeffroy, xii, p. 94, 1876, ☿.

MYRMECIA (PROMYRMECIA) PUMILIO Mayr :

Myrmecia pumilio Mayr, Verh. Zool. bot. Ges. Wien, p. 896, 1866, ☿.
Myrmecia picta Mayr, Jour. Mus. Godeffroy, p. 94, 1876, ☿.

MYRMECIA (PROMYRMECIA) INFIMA Forel :

Myrmecia picta var. *infima* Forel, Ann. Soc. Ent. Belg. 44, p. 54, 1900, ☿ ; Emery, Gen. Insect. Fasc. 118, p. 20, 1911, ☿.

Myrmecia (*Promyrmecia*) *infima* Forel, Wheeler, Colony Founding Among Ants, p. 62, 1933.

Myrmecia picta var. *nigra* Forel, Fauna Sudwest. Aust. i, p. 267, 1907, ☿ ; Emery, Gen. Ins. 118, p. 20, 1911, ☿.

The nest is constructed in the ground ; it is insignificant, and easily overlooked unless the ants are seen to enter or leave, there being no mound. Access to the nest is gained by one small vertical shaft or by several scattered over the area ; the entrances rarely exceed a quarter of an inch in diameter. They extend downward for about eighteen inches, the usual depth of the nest. The soil excavated is carried some distance and scattered, never piled up round the entrance as is usual with most species in the genus. The excavations are not large, consisting only of a few small pockets. The first of these occur just under the surface, others at greater depths. Larvae and pupae can be found generally in the top pockets. At the first alarm they are seized by the workers and carried below to the bottom chamber, and it is, therefore, not possible to state the normal distribution of these in the nest. An interesting feature is that several, and sometimes ergatoid, females may be found in one nest. They can be seen hunting with the workers and carrying food. All the females I have taken have been in perfect condition, so they must live and work together in peace and harmony. It is not usual in this genus, except in a few species, to find more than one female in a nest. They can be found running up and down the trunks of trees which are in blossom. They sip the nectar, and capture small bees and other insects with which they feed the larvae.

This ant will rarely come out to attack, even when one is standing on the nest, but will, however, readily attack when it is outside. This feature is rare in the genus ; most of the species do not need inviting, and they rush out at the least

alarm. The males and females are in flight during January and February.

Myrmecia (Promyrmecia) fucosa, sp. nov.

(Pl. I, figs. 5, 6.)

Worker.—Length, 10–11.5 mm.

Red. Posterior half of head and two apical segments of gaster black. Mandibles and front of face to about the middle of eyes yellow; antennae and anterior legs testaceous; middle and posterior legs brownish.

Head longitudinally and irregularly rugose, densely and finely reticulate between the rugae. Mandibles smooth and shining, with some scattered shallow punctures. Pronotum transversely arched-rugose. Mesonotum finely transverse striate. Epinotum transversely striate-rugose, coarser than on mesonotum but not so coarse as on pronotum. Node strongly and irregularly rugose. Postpetiole and gaster very finely and densely punctate.

Hair greyish, long and erect, abundant on whole body, except the scapes, shorter and suberect on funiculus and legs. Pubescence greyish, long and abundant on postpetiole and gaster, forming a distinct covering, sometimes hiding the sculpture; sparse elsewhere.

Head slightly longer than broad, broader in front than behind, occipital border feebly concave, angles rounded. Mandibles not as long as head; external border almost straight to apical third; inner border nearly straight to basal third, then greatly reduced to the base; furnished with nine teeth, the third, fifth, seventh, eighth and ninth twice as large as the first two; the eighth forms the angle between the two apparent borders, the ninth placed just in front of middle of basal border. Frontal carinae extending to the posterior margin of eyes. Clypeus obtusely excised at middle in front; anterior corners produced as blunt tooth-like angles. Labrum broadly rounded, extending outward to apex of clypeus. Eyes and ocelli large and prominent. Scapes not extending to the occipital border; first segment of funiculus slightly shorter than second, but longer than third, apical one and one-half times longer than tenth. Thorax two and one-half times as long as broad. Pronotum broader than long. Epinotum about one and one-half times as long as broad, boundary between the dorsum and declivity feebly indicated. Node as long as broad, slightly broader behind than in front; in profile slightly longer than high, nearly flat above, anterior face vertical, posterior face descending in a gradual slope; the stalk in front is not quite half the length of node; postpetiole very slightly broader than long, much broader behind than in front. First segment of gaster as broad as long, slightly broader behind than in front. Legs moderately long and slender.

Female.—Length, 11–13 mm.

Resembles the worker, but much larger and winged. The sculpture slightly coarser on head, thorax and node. The colour is similar, except that on two females examined the scutellum and sides of the mesonotum are brown, or blackish.

Male.—Unknown.

Habitat.—Victoria: Lake Hattah, Ouyen ♀ (J. E. Dixon), Sea Lake ♀ (J. C. Goudie), Wyperfield ♀ ♀ (J. Clark). South Australia: Murray Bridge (A. M. Lea, ♀).

At first sight this appears to be a variety of *M. (P.) picta* Sm., which it resembles in size and colour. It is, however, readily distinguished from it by the form of the mandibles, antennae and nodes.

The mandibles of *fucosa* and of *nigrocincta* are somewhat similar, but the difference in the antennal scapes prevent the two species from being placed together.

The nest and habits are similar to those of *M. (P.) picta.*

Genus MYRMECIA Fabr. 1804.

Myrmecia esuriens Fabr.

(Pl. I, figs. 7, 8.)

Syst. Piez., p. 424, 1804, ♀.
Myrmecia tasmaniensis Smith, Cat. Hym. Brit. Mus. vi, 147, 1858, ♀.
Myrmecia walkeri Forel, Ann. Soc. Ent. Belg., 37, p. 456, 1893, ♀.
Myrmecia esuriens Fabr. Emery, Gen. Ins. Fasc. 118, p. 21, 1911, ♀.

Worker.—Length, 14–18 mm.

Black. Mandibles, labrum, antennae, legs, coxae, postpetiole and apical segments of gaster ferruginous.

Head longitudinally rugose. Pronotum arched rugose, the rugae irregular, sometimes almost longitudinal in the centre. Mesonotum and epinotum transversely rugose. Node coarsely and irregularly rugose. Postpetiole and gaster fine and densely punctate.

Hair yellow, erect, short and abundant on head, thorax and nodes, longer on gaster; very short, suberect and scattered on legs, not apparent on antennae. Pubescence very fine, adpressed, moderately abundant throughout, much longer and very abundant on gaster where it forms a distinct yellowish covering.

Head as long as broad, occipital border straight, sides convex, the angles rounded. Mandibles slightly shorter than head, external border concave in middle; inner border strongly reduced from fourth large tooth to base. Scapes extending beyond occipital border by the length of first segment of funiculus; second segment one-fourth longer than first, third shorter than first. Thorax two and one-half times longer than broad. Node one-third broader than long, broader behind than in front: in profile higher in front than behind, the anterior face vertical, dorsum and posterior face united in a curve, the stalk in front very short. Postpetiole one and one-half times broader than long. First segment of gaster broader than long. Legs short and robust.

Female.—Length, 22–24 mm. (Ergatoid).

Similar to the worker but larger and the sculpture coarser. Postpetiole darker, more brownish. Head square, as broad in front as behind. Scapes extending beyond occipital border by their thickness. The thorax bears a very small scutellum, but has no traces of wing insertions. Node transversely oval, one and one-half times broader than long. Postpetiole one-fourth broader than long. Legs robust.

Male.—Length, 16 mm.

Black. Mandibles, labrum, antennae, legs, coxae, petiole, postpetiole, first and last segments of gaster ferruginous; apical margins of other segments of gaster ferruginous.

Head longitudinally rugose. Thorax and node irregularly and coarsely punctate, almost rugose. Epinotum more finely so. Postpetiole and gaster very finely and densely punctate.

Head broader than long, strongly convex behind and on the sides. Mandibles short, triangular, inner and basal borders of equal length, the former concave, with a short tooth in middle, the point and basal angle forming broad blunt teeth. Clypeus convex, produced and feebly concave in front. Frontal carinae short, widely diverging behind. Eyes large and convex, occupying almost half the sides of head. Ocelli large and convex. Antennae long and slender. Scapes twice as long as first segment of funiculus; second segment six times as long as first, the others subequal to apical which is one-fourth longer than the preceding. Thorax two and one-half times longer than broad. Pronotum short, convex in front and on sides. Mesonotum as long as broad, mayrian furrows deeply impressed, parapsidal furrows fine, but distinct. Scutellum broader than long, strongly convex above. Epinotum convex transversely and longitudinally, merged into declivity without traces of a boundary. Node broader than long, much broader behind than in front, convex in all directions; a sharp longitudinal carina on dorsum; in profile dome-shaped, the stalk in front as long as that behind. Postpetiole almost one-third broader than long. First segment of gaster broader than long, much broader behind than in front. Legs long and rather robust. Wings hyaline.

Habitat.—Tasmania: Hobart (C. Lord, Dr. G. A. Waterhouse ☿), Frankston (A. M. Lea ☿), Mt. Wellington (C. Lord), Nat. Park (R. Blackwood ☿ ♀ ♂; F. E. Wilson ☿ ♀).

This very distinct species is found only in Tasmania. The colour and size render it easily recognisable from all others. The female is almost identical with the worker except for size. The very small scutellum is easily overlooked, and the wing pads are entirely missing.

It is owing to the researches of Mr. R. Blackwood, of the Melbourne University, that I have been able to describe the male and female of this species. No other form of female could be found in or near the nests. Mr. Wilson found a populous colony nesting in a large rotten log, from which he secured the female as well as a large number of workers.

Genus NOTHOMYRMECIA, gen. nov.

Worker.—Slender. Head broader behind than in front. Mandibles elongate, not as long as head, broad and rather flattened; inner borders straight to basal fourth then abruptly reduced to base, forming a short, concave, edentate, basal border, inner border furnished with ten or twelve small sharp teeth equally spaced from the very sharp apex to basal angle, between these teeth are minute denticles. Maxillary palpi with six segments. Labial palpi

with four segments. Clypeus large, convex, produced and convex in front. Labrum produced beyond clypeus, sharply pointed in front. Frontal area large. Frontal carinae erect, narrow and almost parallel, not covering the antennal insertions. Antennae long and slender, twelve segments; scapes longer than head, slightly thickened toward apex; funiculus filiform, second segment longest. Eyes large and convex, placed at middle of sides of head. No ocelli. Thorax not margined. Pro-mesonotal suture sharply impressed. Meso-epinotal suture deep and wide. Petiole elongate, with a large node behind; ventral surface with a strong sharp tooth-like projection in front. Postpetiole united with gaster without traces of a constriction, bell-shaped in front; the ventral surface with a long sharp tooth-like projection in front. Gaster ovate, longer than broad. Sting very long and stout. Legs rather long and robust. Anterior tibiae with one long broad pectinate spur and two short stout bristles. Middle tibiae with two long sharp bristle-like spurs. Posterior tibiae with one long broad pectinate spur and one long thin bristle-like spur. Fourth segment of all tarsi bilobed. Claws stout, bidentate.

Genotype, *Nothomyrmecia macrops*, sp. nov.

Near Myrmecia from which it is readily separated by the form of the head, mandibles, clypeus, eyes and the lack of ocelli as well as the postpetiole which is not constricted behind to form a second node. It is not near any other existing genus.

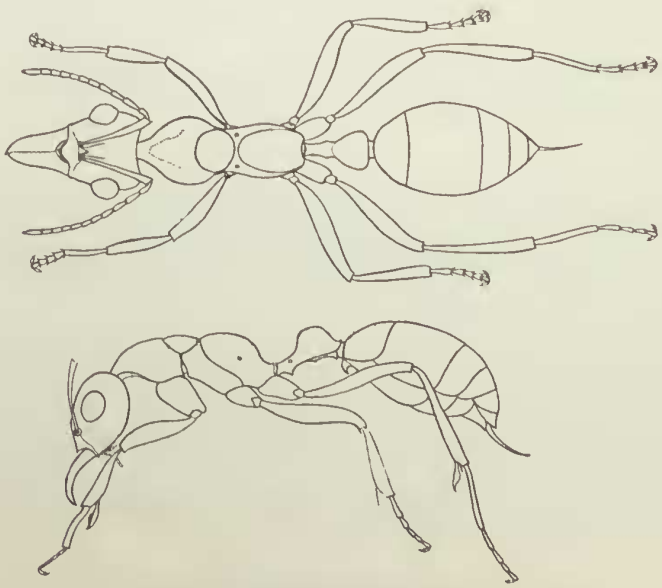


Fig. 1. Nothomyrmecia macrops, sp. nov.

Nothomyrmecia macrops, sp. nov.

(Text fig. 1.)

Worker.—Length, 9.7–11 mm.

Testaceous, basal half of first segment of gaster darker. Mandibles, clypeus, antennae and legs pale yellow.

Mandibles very finely and densely punctate, with a row of large punctures along inner border at base of teeth. Clypeus and head very finely and superficially reticulate. Pronotum finely rugose, the rugae forming feeble transversely arched ridges. Mesonotum finely reticulate with a few large shallow punctures. Epinotum transversely and finely rugose. Node smooth in front, finely reticulate and with a few large punctures behind. Postpetiole gaster, antennae and legs microscopically punctate.

Hair yellow, erect, moderately long and abundant throughout, shorter and suberect on antennae and legs. Pubescence white, very fine and adpressed, abundant throughout but not hiding the sculpture.

Head as long as broad, much broader behind than in front, broadest just behind the eyes, sides convex, occipital border strongly concave, angles strongly rounded. Mandibles shorter than head, external borders straight to apical third then rounded inward and downward; inner border straight to basal fourth then abruptly reduced to base, furnished with ten or twelve small sharp teeth, about equally spaced along the edge, with minute denticles between them, basal angle sharp, apex long and pointed. Clypeus feebly convex above, produced and convex in front. Frontal carinae erect, almost parallel, extending backward level with middle of eyes, not covering the antennal insertions in front. Eyes large and convex, placed at middle of sides slightly on top, occupying fully one-third of sides. No ocelli. Scapes extending beyond occipital border by one-fifth their length, slightly thickened toward the apex; second segment of funiculus one-fourth longer than first, third and fourth, these equal in length, fifth to tenth becoming gradually shorter, apical as long as the two preceding together. Thorax two and three-quarters times longer than broad. Pronotum slightly broader than long, strongly convex in all directions. Mesonotum almost as long as broad, almost circular, strongly convex transversely. Epinotum longer than broad, convex in all directions; in profile the dorsum and declivity strongly convex without traces of a boundary. Node slightly broader than long, bluntly pointed in front, convex in all directions; in profile longer than high, dome shaped but slightly higher in front than behind, one-third longer than the stalk in front; ventral surface with a long broad bluntly pointed tooth in front directed downward. No traces of a constriction between the postpetiole and gaster. Postpetiole twice as broad as long, bell-shaped; ventral surface with a long sharp, hook-shaped, semi-transparent tooth directed backward. First segment of gaster one-third broader than long, broader behind than in front, sides strongly convex. Sting very long and stout. Legs robust.

Habitat.—Western Australia, Russell Range (Miss A. E. Baesjou).

Described from two examples captured by Miss Baesjou near the Russell Range, inland from Israelite Bay.

This remarkable ant is not closely related to any other known to me. The long broad jaws with very fine sharp teeth, meeting

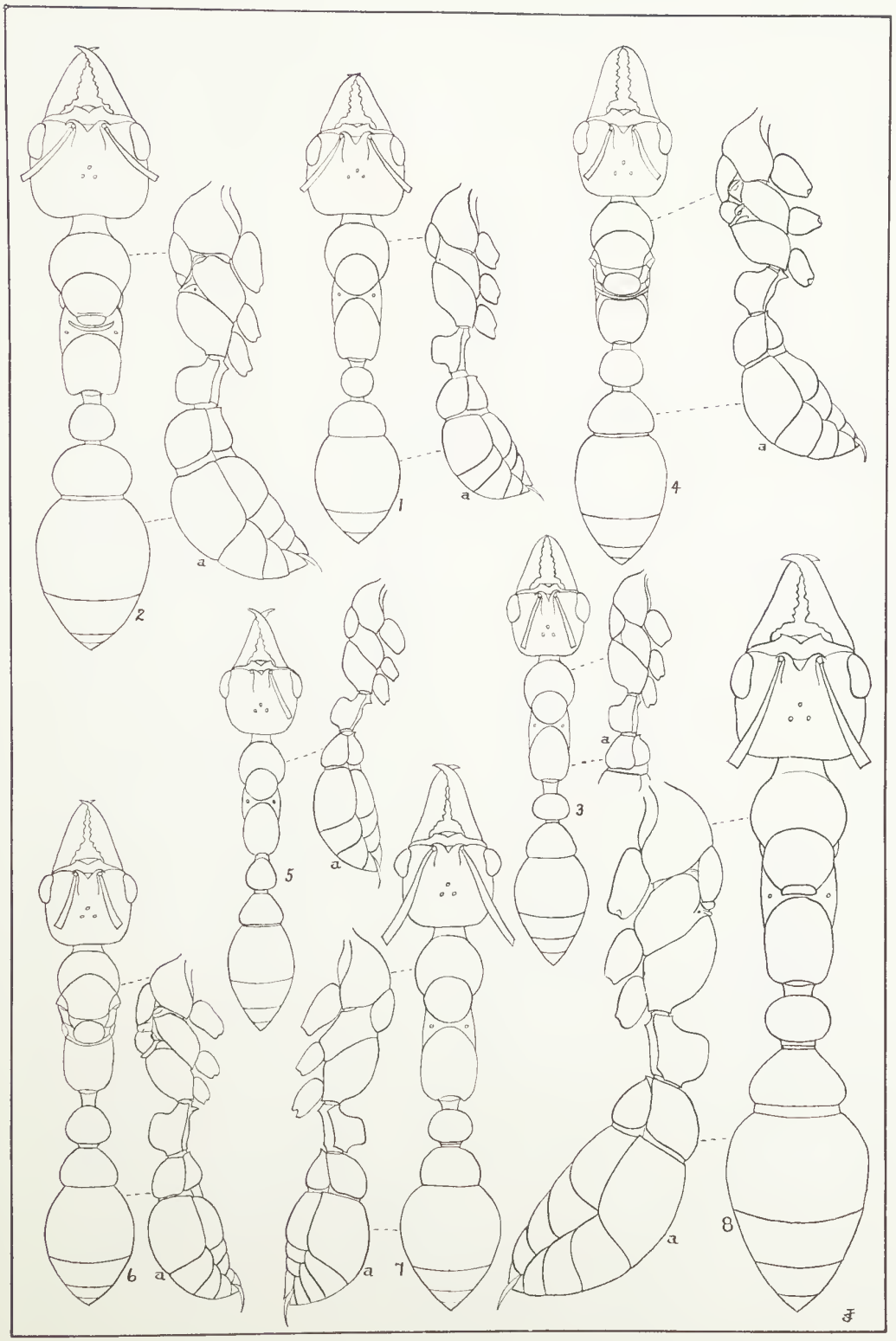
along the full length of their inner border, suggest that it is predaceous ; this is further suggested by the very large eyes and long strong legs. The head and gaster are not like those of any other Australian Ponerine, but the thorax and node are identical with that of the genus *Myrmecia*. Although much smaller this species more closely resembles *Myrmecia* s. str. than its subgenus *Promyrmecia*.

From the description of *Prionomyrmex*, from the Baltic Amber, the head and mandibles appear to be somewhat similar but the nodes are different.

Beyond those collected by Miss Baesjou very few species of ants have been seen from the great stretch of country lying between Albany, Western Australia, and Port Lincoln, South Australia. Thanks to this keen artist-naturalist many new and rare species have been brought to light, clearly showing that some of these ancient ranges contain many primitive forms at present unknown.

Plate I.

Figs. 1, 2.—*Myrmecia* (*Promyrmecia*) *aberrans* ; worker (1) and female (2).
Figs. 3, 4.—*M.* (*P.*) *picta* Smith ; worker (3) and female (4).
Figs. 5, 6.—*M.* (*P.*) *fucosa* sp. nov. ; worker (5) and female (6).
Figs. 7, 8.—*M. esuriens* Fabr. ; worker (7) and female (8).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